

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

International Patent Classification 6: H04L 12/24, 12/14	A1	(11) International Publication Number: WO 98/33302
		(43) International Publication Date: 30 July 1998 (30.07.98)

International Application Number: PCT/US98/01496

International Filing Date: 23 January 1998 (23.01.98)

Priority Data:

60/034,874	27 January 1997 (27.01.97)	US
08/960,827	30 September 1997 (30.09.97)	US

Applicant: DSC TELECOM L.P. [US/US]: 1000 Coit Road, Plano, TX 75075 (US).

Inventors: PULLEN, Steve, M.; 8313 Bristol Court, Rowlett, TX 75088 (US). MILLER, Donald, W., Jr.; 6400 Ohio Drive, Plano, TX 75024 (US). ATKINSON, Carla, M.; 1901 Treehouse Lane, Plano, TX 75023 (US). BISHOP, Eddie, E., Jr.; 205 High Meadow Drive, McKinney, TX 75070 (US). HORVATH, Joe, K.; 7404 Stony Point Drive, Plano, TX 75023 (US). BLANCHARD, Alfred, J.; 2013 Pleasant Valley Drive, Plano, TX 75023 (US). GATES, Ronald, H.; 6619 Hyacinth Lane, Dallas, TX 75252 (US).

Agent: FISH, Charles, S.; Baker & Botts, L.L.P., 2001 Ross Avenue, Dallas, TX 75201-2980 (US).

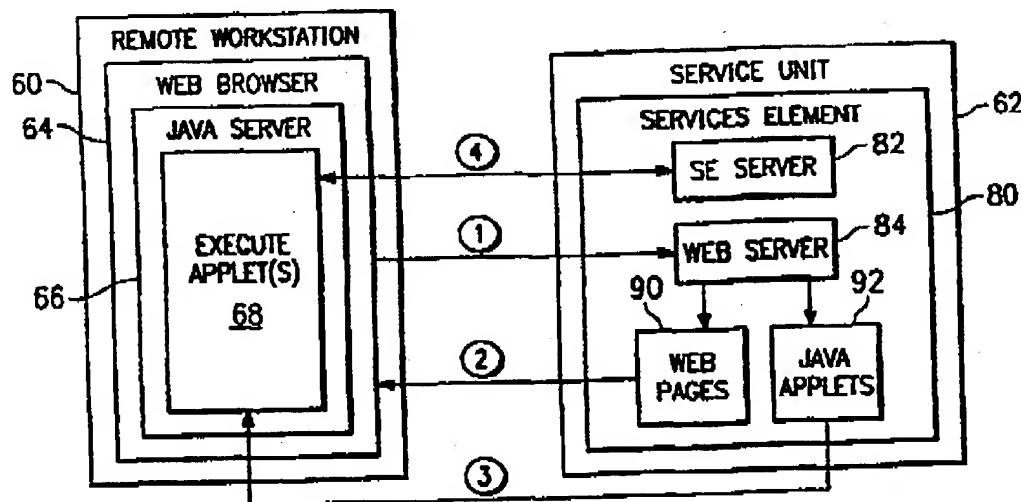
(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published

With international search report.

Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

1) Title: SYSTEM AND METHOD FOR MONITORING AND MANAGEMENT OF TELECOMMUNICATIONS EQUIPMENT USING ENHANCED INTERNET ACCESS



57) Abstract

A system (20) for monitoring and management of telecommunications equipment (10, 30) in a telecommunications network via the internet (34) is provided. The system (20) includes a plurality of user devices (36, 46, 50) each executing a web browser (64) for communications with the internet (34). An intranet (32) is in communications with the internet (34). A web server (84) identifiable by an internet address resides on each telecommunications equipment (10, 30), where the telecommunications equipment of the telecommunications network are coupled to the intranet (32). A plurality of web pages (90) for displaying monitoring and management information associated with the telecommunications equipment are accessible by the web server (84) via the internet (34) and intranet (32).

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

WO 98/33302

PCT/US98/01496

1

SYSTEM AND METHOD FOR MONITORING AND MANAGEMENT
OF TELECOMMUNICATIONS EQUIPMENT USING
ENHANCED INTERNET ACCESS

TECHNICAL FIELD OF THE INVENTION

This invention is related in general to the field of telecommunications. More particularly, the invention is related to a system and method for monitoring and management of telecommunications equipment using enhanced internet access.

BACKGROUND OF THE INVENTION

A telecommunications service provider such as MCI typically owns and operates a large number of telecommunications switches and other equipment in the public switched telephone network. These telecommunications switches are generally physically located throughout the United States and the globe to achieve close proximity access to the telephone customers.

Within the telecommunications service provider there may be a central network operations site that has access to all the telecommunications equipment in the network owned by the service provider to perform support, monitoring and management services. These services include billing, and setting up or changing telephone services. The telecommunications equipment are further monitored and

controlled by additional craft personnel who operate out of offices that are physically located closer to the equipment they manage. Other craft personnel may operate out of more remote sites such as their home offices. Typically, a
5 modem-based RS232 ASCII protocol is used for the link up between X-terminals located at the remote sites to the telecommunications equipment. Although graphical user interfaces (GUIs) can be supported by this access scheme, it is excruciating slow because it operates on a bit map or
10 pixel information basis. Thus, a very wide pipe, such as a T1 span, is required to enable even minimally adequate graphical update of screen information and display.

There is a further need to allow the telecommunications equipment manufacturer to have access to
15 the telecommunications equipment for further product support. Generally, the customer support, field service personnel, and engineers do not have access to most or all of the telecommunications equipment operating in the field. This is highly desirable to provide the telecommunications
20 service provider, and, ultimately, the telecommunications customers, the best and responsive maintenance and support possible.

SUMMARY OF THE INVENTION

25 Accordingly, there is a need to provide enhanced access to telecommunications equipment in the telecommunications network for monitoring and management thereof.

30 In accordance with the present invention, system and method for monitoring and management of telecommunications equipment using enhanced internet access are provided which eliminate or substantially reduce the disadvantages associated with prior systems and methods.

NO 98/33302

PCT/US98/01496

3

In one aspect of the invention, a system for monitoring and management of telecommunications equipment using the internet is provided. The system includes a web server residing on the telecommunications equipment, where the web server is identifiable by an internet address. A plurality of web pages containing monitor information associated with the telecommunications equipment are accessible by the web server by specifying an internet address therefor. A web browser application executing on a user device may be connected with the web server using its internet address and to further receive the plurality of web pages therefrom over the internet. The web pages further receive user input and transmit them to the web server.

In another aspect of the invention, a system for monitoring and management of telecommunications equipment in a telecommunications network via the internet is provided. The system includes a plurality of user devices each executing a web browser for communications with the internet. An intranet is in communications with the internet. A web server identifiable by an internet address resides on each telecommunications equipment, where the telecommunications equipment of the telecommunications network are coupled to the intranet. A plurality of web pages for displaying monitoring and management information associated with the telecommunications equipment are accessible by the web server via the internet and intranet.

In yet another aspect of the invention, a method for monitoring and management of telecommunications equipment in a telecommunications network via the internet is provided. The method includes the steps of connecting a plurality of user devices to the internet, each user device executing a web browser, and connecting the

telecommunications equipment by an intranet to the internet. The telecommunications equipment may be accessed by specifying an internet address of a web server residing on the telecommunications equipment, and downloading a plurality of web pages from the web server via the internet and intranet. The web pages display monitor and management information associated with the telecommunications equipment.

10 BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention, reference may be made to the accompanying drawings, in which:

15 FIGURE 1 is a high level block diagram of a distributed telecommunication switching system;

FIGURE 2 is a high level block diagram of apparatus and method for monitoring and management of telecommunications equipment using enhanced internet access according to an embodiment of the present invention;

20 FIGURE 3 is a more detailed block diagram of an exemplary communications process between a piece of telecommunications equipment and a remote workstation according to an embodiment of the present invention;

25 FIGURE 4 is an exemplary screen of a web page serving as an entry point into remote access of telecommunications equipment via internet according to an embodiment of the present invention;

30 FIGURE 5 is an exemplary screen of a web page providing a selection list of telecommunications equipment available for access via internet according to an embodiment of the present invention;

FIGURE 6 is an exemplary screen of a web page providing a selection of available monitoring and

WO 98/33302

PCT/US98/01496

5

management functionality for access via internet according to an embodiment of the present invention;

FIGURE 7 is an exemplary screen of a web page executing one or more java applets and displaying a list of registered tasks or applications via internet according to the teachings of the present invention;

FIGURE 8 is an exemplary screen of a web page executing one or more java applets and displaying a trace log via internet according to an embodiment of the present invention;

FIGURE 9 is an exemplary screen of a web page executing one or more java applets and displaying the status of an automatic message accounting server via internet according to an embodiment of the present invention;

FIGURE 10 is a portion of an exemplary screen of a web page executing one or more java applets and displaying a morning report via internet according to an embodiment of the present invention; and

FIGURE 11 is a block diagram of exemplary server processes running in the services element according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The preferred embodiment(s) of the present invention is (are) illustrated in FIGURES 1-11, like reference numerals being used to refer to like and corresponding parts of the various drawings.

Referring to FIGURE 1, a distributed telecommunications switching system 10 is shown. Distributed telecommunications switching system 10 includes a service unit 12 that preferably provides control and management on an advanced intelligent network (AIN) service

platform using information network architecture (INA) software design principles. Distributed telecommunications switching system 10 further includes at least one delivery unit 14 that provides the message transport mechanism for
5 call information under the control and direction of service unit 12. Service unit 12 and delivery units 14 may communicate with one another through a fiber optic or wire-based ring 16. Call information is preferably transported between delivery units 14 and service unit 12 in
10 asynchronous transfer mode (ATM) cell format. Delivery units 14 may operate in a broadband, wideband, narrowband, or a combination of these speeds and formats. For a more detailed description of distributed telecommunications switching system 10, please refer to U.S. Patent 5,495,484,
15 titled *Distributed Telecommunications Switching System*, issued to Self et al. on Feb. 27, 1996, which is incorporated herein by reference.

To provide maintenance and management of distributed telecommunications switching system 10 and other
20 telecommunications equipment 30 in the telecommunications network, access thereto is provided through a telecommunications services provider's intranet 32 and the internet 34. Through internet 34 and intranet 32, telecommunications services provider's operations and
25 support personnel 36 at various sites may access, monitor and control any of the telecommunications equipment. This may include personnel who operate out of home offices 46 or sites remote from a centralized network operations site 38, or customer support and craft sites 40 and 42. Further,
30 personnel 50 of the telecommunications equipment manufacturer, such as customer support 52, field service 54, and development/engineering 56, may also access and provide maintenance and support of telecommunications

PCT/US98/01496

7

network through internet 34 and

, a remote workstation 60 may
of telecommunications equipment
a internet 34 and intranet 32
station 60 may be a personal
notebook computer, workstation,
platform that is capable of
gram 64, preferably one that is
etscape Navigator™ and Microsoft
rowser 64 is Java-enabled, it
engine 66 that enables it to
plication programs 68.

ides a services element (SE) 80
r that controls and manages all
service unit 62, including a
and a web server 84. Services
s web pages 90 in a specialized
ext markup language (HTML), and
ide the context and application
ontrol service unit 62.

ation 60 dials up to an internet
modem (not shown) to obtain an
craft personnel connects with web
web address or uniform resource
ser 64. When a connection with
home web page may be displayed
a craft personnel may specify a
supplying its address or by
on displayed on the home web page
looks up and sends the requested
ted then displayed on the screen
2). Web server 84 further looks

up and transmits one or more Java applets associated with the requested web page (action 3), which is then executed by Java server 66 on workstation 60. The executing Java applet may perform different functions, one of which is to request specific data or information from services element server 82, such as trace log data for program trace information, information and problem reports (IPRs) for system status information, and automatic message accounting (AMA) status and information for billing purposes. Executing applets 68 may also allow a craft personnel to send command and control data to services element server 82, which may modify or update service unit operations.

Operating in this manner, authorized operations and support personnel of both the telecommunications services provider and equipment manufacturer may access and control the operations of all telecommunications equipment in the network in a fast and efficient manner. This access method is platform independent and only requires the remote workstation to have a Java-enabled web browser to function. Accordingly, problems that surface in the middle of the night may be easily responded to by craft personnel working on home computers. The operations of remote equipment may also be easily maintained and managed. Further, the web pages along with the displayed data can be easily printed to obtain hard copy information of the telecommunications equipment.

It may be seen that network security issues must be addressed, and that security measures such as fire walls and the like may be used to ensure only personnel with the proper authorization may access in this manner.

FIGURE 4 is an exemplary home page that provides access to telecommunications equipment in the network. The text "DSC Megahub™ Sites" may be highlighted to show that

WO 98/33302

PCT/US98/01496

9

it is a hyper link to another web page, which is shown in FIGURE 5. FIGURE 5 provides a list of hyper links to a number of telecommunications equipment, more specifically, telecommunications switches, that are in the network and available for access. The craft personnel may select a specific equipment by clicking on its name, which brings up a subsequent web page, shown in FIGURE 6. FIGURE 6 provides an exemplary list of functionality available for the selected equipment, which includes functionality related to a site or service unit, or functionality related to a delivery unit of the site.

FIGURE 7 is an exemplary screen representation of the services element node manager or services element web page, when it is selected. A list of tasks or processes registered with services element is displayed along with attendant information. Where more than one equipment is resident at the same site, the craft personnel may supply a node identifier (ID) and local area network (LAN) controllers to enable the monitoring and management of specific local area network (LAN) segments and communications thereon.

FIGURE 8 is an exemplary screen representation of a web page providing trace message information. Trace logs may be used to gather data during network and equipment troubleshooting sessions, for example. Filters are available to provide several levels or views of trace messages. As it may be seen, the trace function may focus on one or more domains or sub-domains.

Automated message accounting is the function of dumping or transferring call records to tape. FIGURE 9 provides an exemplary screen representation of a web page that provides automatic message accounting monitoring and management. From this web page, a craft personnel may

search for a specific block of call records, and manually dump it to tape, for example.

FIGURE 10 is an exemplary web page of a morning report, also available through internet access according to the teachings of the present invention. Every morning or any other selected time of the day or night, certain specific information about each equipment or site may be collected and reported by Java applets of this web page. An exemplary list of information is shown in FIGURE 10.

Referring to FIGURE 11, it may be that in addition to services element server 82 and web server 84 described above, there may be further provided an automatic message accounting server 500, an information and problem report server 502, and a trace log server 504 that perform the respective functions and provide web server 84 the attendant information displayed by each web page. For a more detailed discussion of automatic message accounting server 500, please refer to U.S. Patent Application Serial No. 08/757,465, titled *Database-Driven Automatic Message Accounting System and Method* (Attorney Docket 036560.1565), incorporated herein by reference.

Although several embodiments of the present invention and its advantages have been described in detail, it should be understood that mutations, changes, substitutions, transformations, modifications, variations, and alterations can be made therein without departing from the teachings of the present invention, the spirit and scope of the invention being set forth by the appended claims.

WO 98/33302

PCT/US98/01496

11

WHAT IS CLAIMED IS:

1. A system for monitoring and management of telecommunications equipment using the internet, comprising:

5 a web server residing on the telecommunications equipment, the web server being identifiable by an internet address;

10 a plurality of web pages adapted to display monitor information associated with the telecommunications equipment and receive user input, the web pages being accessible by the web server and each web page being identifiable by an internet address; and

15 a web browser application executing on a user device adapted to connect with the web server using its internet address and to further receive the plurality of web pages therefrom over the internet, and to receive the user input and transmit the user input to the web server.

20 2. The system, as set forth in claim 1, further comprising an automatic message accounting server accessible by the web browser and having a plurality of web pages dedicated to billing information monitoring and management.

25 3. The system, as set forth in claim 1, further comprising an information and problem report server accessible by the web browser and having a plurality of web pages dedicated to system status information monitoring and management.

30 4. The system, as set forth in claim 1, further comprising a trace log server accessible by the web browser

12

and having a plurality of web pages dedicated to program trace information monitoring and management".

5 5. The system, as set forth in claim 1, further comprising java applets associated with the plurality of web pages, the java applets being downloadable to the user device and executed by the web browser.

10 6. The system, as set forth in claim 1, wherein the telecommunications equipment is a distributed switching system having a service unit coupled to at least one delivery unit, the web server residing in the service unit.

15 7. The system, as set forth in claim 1, further comprising an intranet coupling the user device to the web server residing on the telecommunications equipment.

20 8. The system, as set forth in claim 1, further comprising an automatic message accounting server in communications with the web server and having a plurality of web pages dedicated to billing information monitoring and management.

PCT/US98/01496

13

ystem, as set forth in claim 1, further
nformation and problem report server in
with the web server and having a plurality
dedicated to system status information
management.

ystem, as set forth in claim 1, further
ace log server in communications with the
aving a plurality of web pages dedicated to
information monitoring and management.

14

11. A system for monitoring and management of telecommunications equipment in a telecommunications network via the internet, comprising:

5 a plurality of user devices each executing a web browser for communications with the internet;

an intranet in communications with the internet;

10 a web server identifiable by an internet address residing on each telecommunications equipment, the telecommunications equipment of the telecommunications network being accessible by the intranet; and

15 a plurality of web pages adapted to display monitor information associated with the telecommunications equipment and receive user input, the web pages being accessible by the web server and each web page being identifiable by an internet address.

12. The system, as set forth in claim 11, further comprising an automatic message accounting server accessible by the web browser and having a plurality of web
20 pages dedicated to billing information monitoring and management.

13. The system, as set forth in claim 11, further comprising an information and problem report server accessible by the web browser and having a plurality of web
25 pages dedicated to system status information monitoring and management.

14. The system, as set forth in claim 11, further comprising a trace log server accessible by the web browser
30 and having a plurality of web pages dedicated to program trace information monitoring and management.

WO 98/33302

PCT/US98/01496

15

15. The system, as set forth in claim 11, further comprising java applets associated with the plurality of web pages, the java applets being downloadable to the user device and executed by the web browser.

16. The system, as set forth in claim 11, wherein the telecommunications equipment is a distributed switching system having a service unit coupled to at least one delivery unit, the web server residing in the service unit.

17. The system, as set forth in claim 11, wherein the plurality of web pages include web pages dedicated to automatic message accounting information for billing information monitoring and management.

18. The system, as set forth in claim 11, wherein the plurality of web pages include web pages dedicated to information and problem report information for system status information monitoring and management.

19. The system, as set forth in claim 11, wherein the plurality of web pages include web pages dedicated to program trace information monitoring and management.

16

20. A method for monitoring and management of telecommunications equipment in a telecommunications network via the internet, comprising the steps of:

connecting a plurality of user devices to the
5 internet, each user device executing a web browser;

connecting the telecommunications equipment by an intranet to the internet;

accessing a telecommunications equipment by specifying an internet address of a web server residing on the
10 telecommunications equipment; and

downloading a plurality of web pages from the web server via the internet and intranet, the web pages being adapted to display monitor and management information associated with the telecommunications equipment.

15

21. The method, as set forth in claim 20, further comprising the steps of:

accessing an automatic message accounting server; and
downloading a plurality of web pages dedicated to
20 billing information monitoring and management.

22. The method, as set forth in claim 20, further comprising the steps of:

accessing an information and problem report server;
25 and

downloading a plurality of web pages dedicated to system status information monitoring and management.

23. The method, as set forth in claim 20, further comprising the steps of:

accessing a trace log server; and
downloading a plurality of web pages dedicated to
30 program trace information monitoring and management.

PCT/US98/01496

17

The method, as set forth in claim 20, further comprising the step of executing java applets associated with a plurality of web pages, the java applets being executable by the user device and executed by the web.

The method, as set forth in claim 20, wherein the foregoing step further comprises the step of downloading a plurality of web pages dedicated to automatic message and information monitoring and management.

The method, as set forth in claim 20, wherein the foregoing step further comprises the step of downloading a plurality of web pages dedicated to system status monitoring and management.

The method, as set forth in claim 20, wherein the foregoing step further comprises the step of downloading a plurality of web pages dedicated to program trace and operation monitoring and management.

FIG. 1

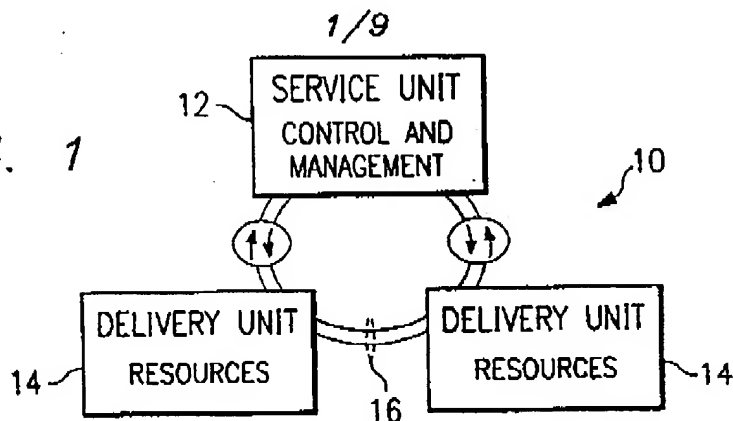
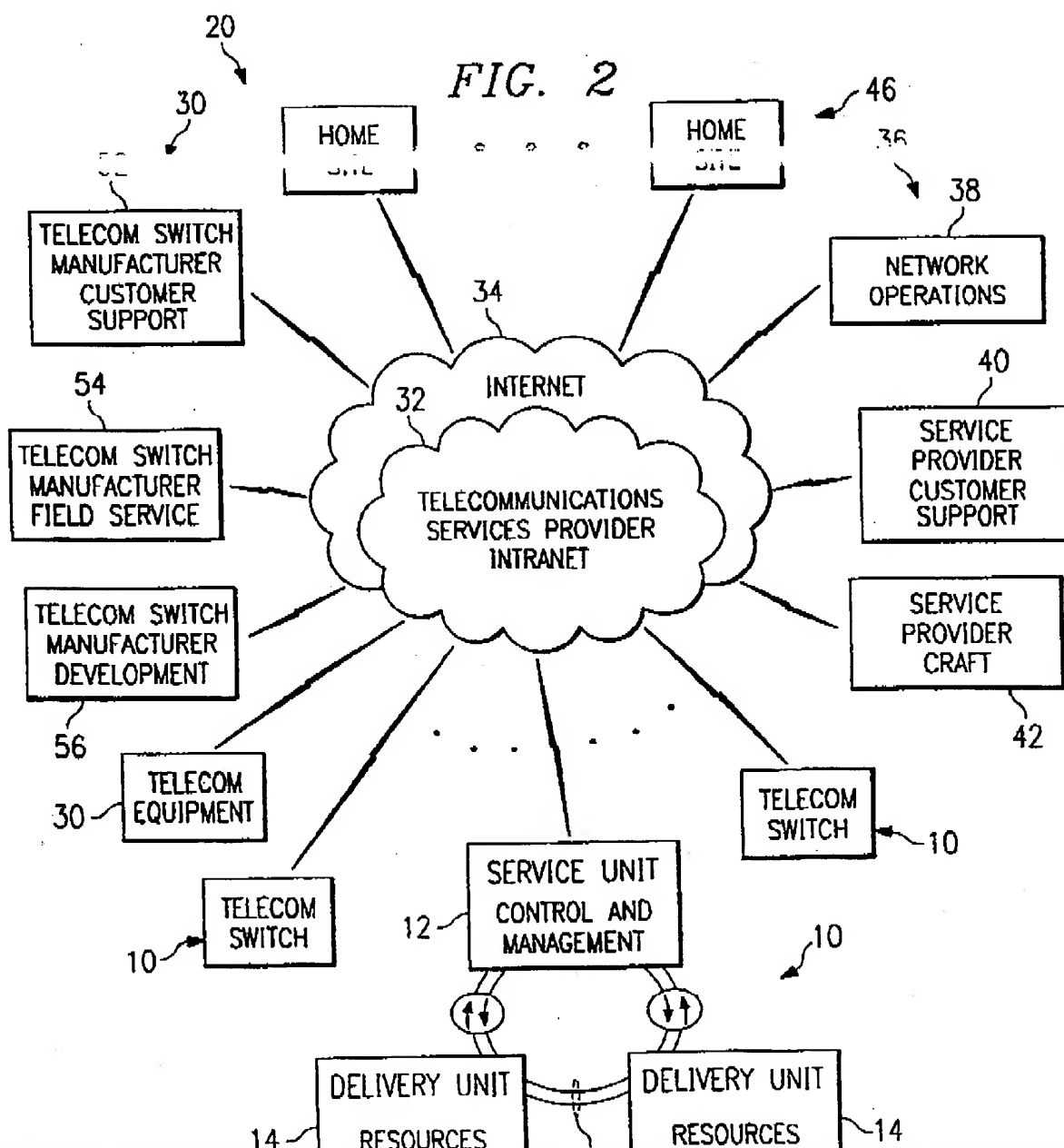


FIG. 2



WO 98/33302

PCT/US98/01496

2/9

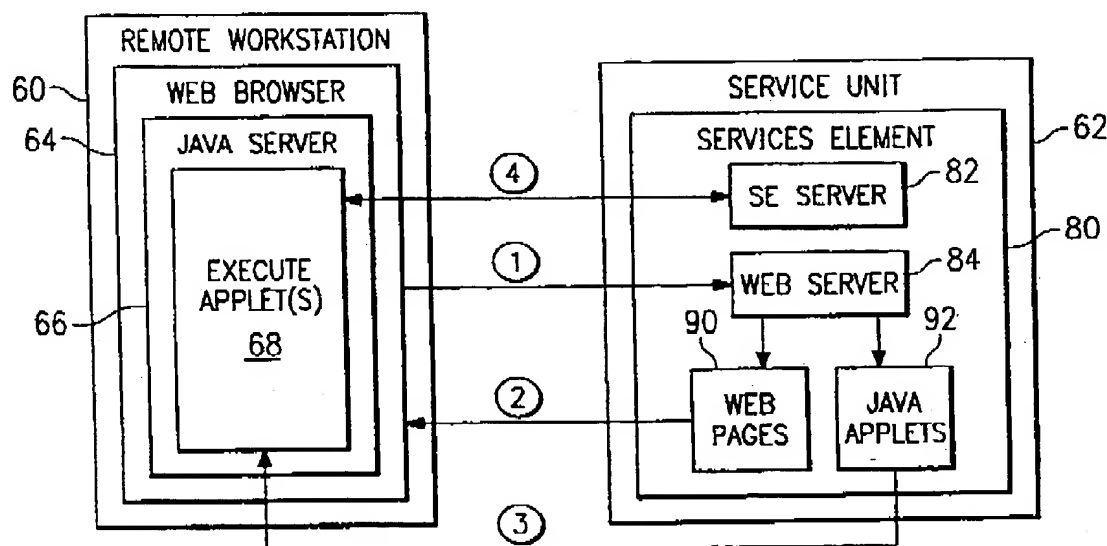
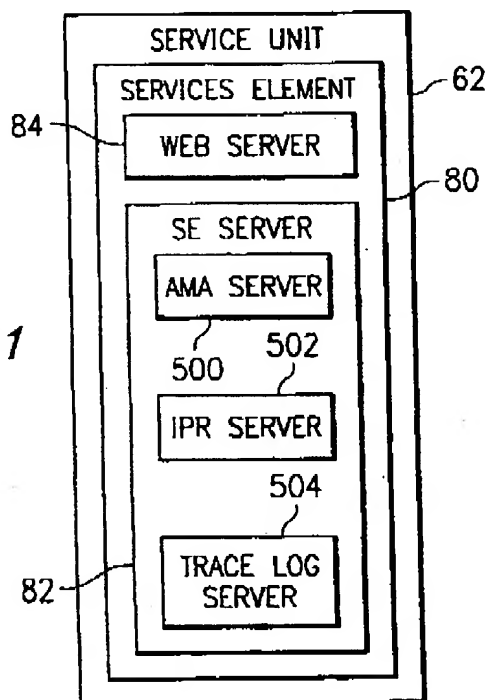


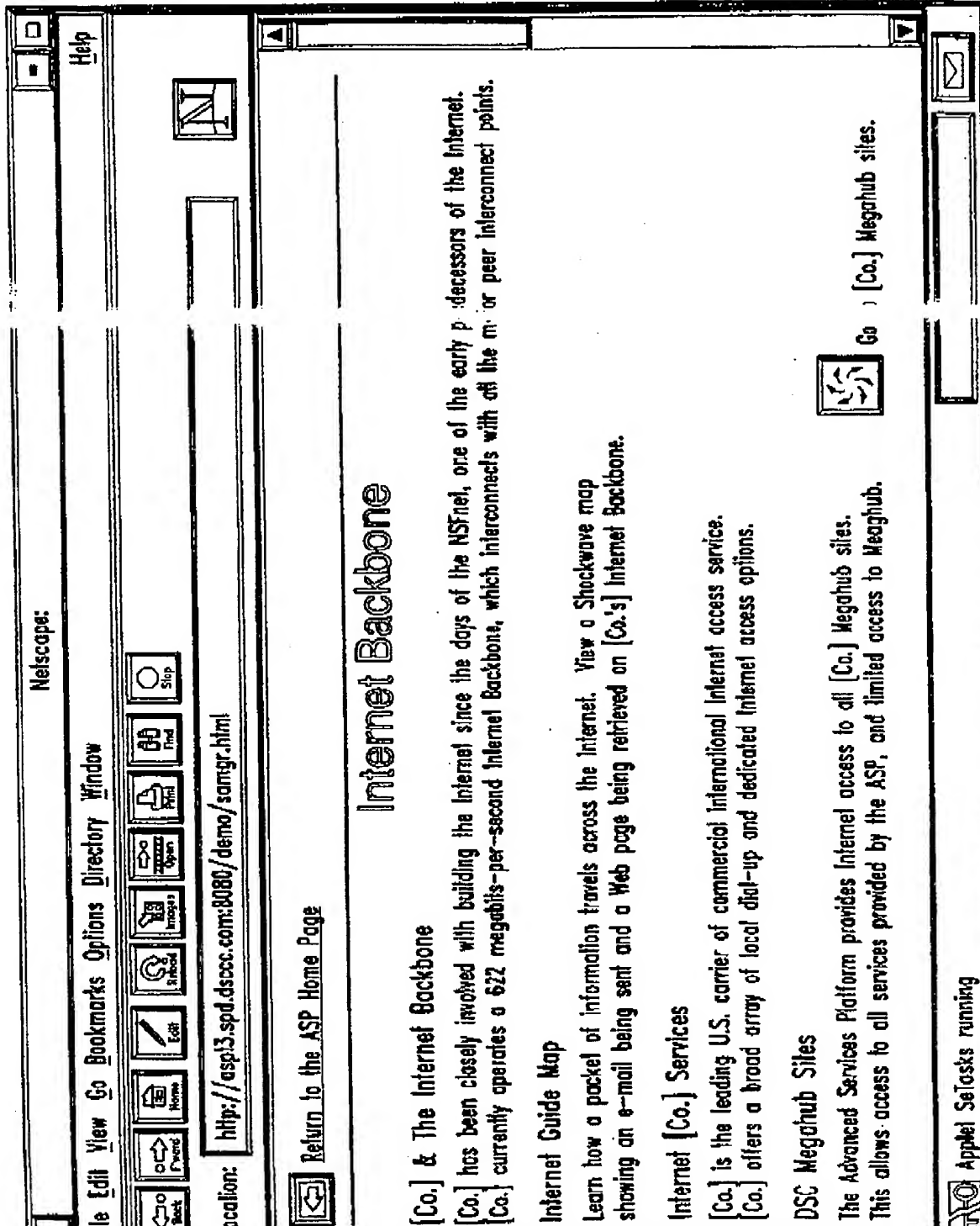
FIG. 3

FIG. 11



3/9

FIG. 4

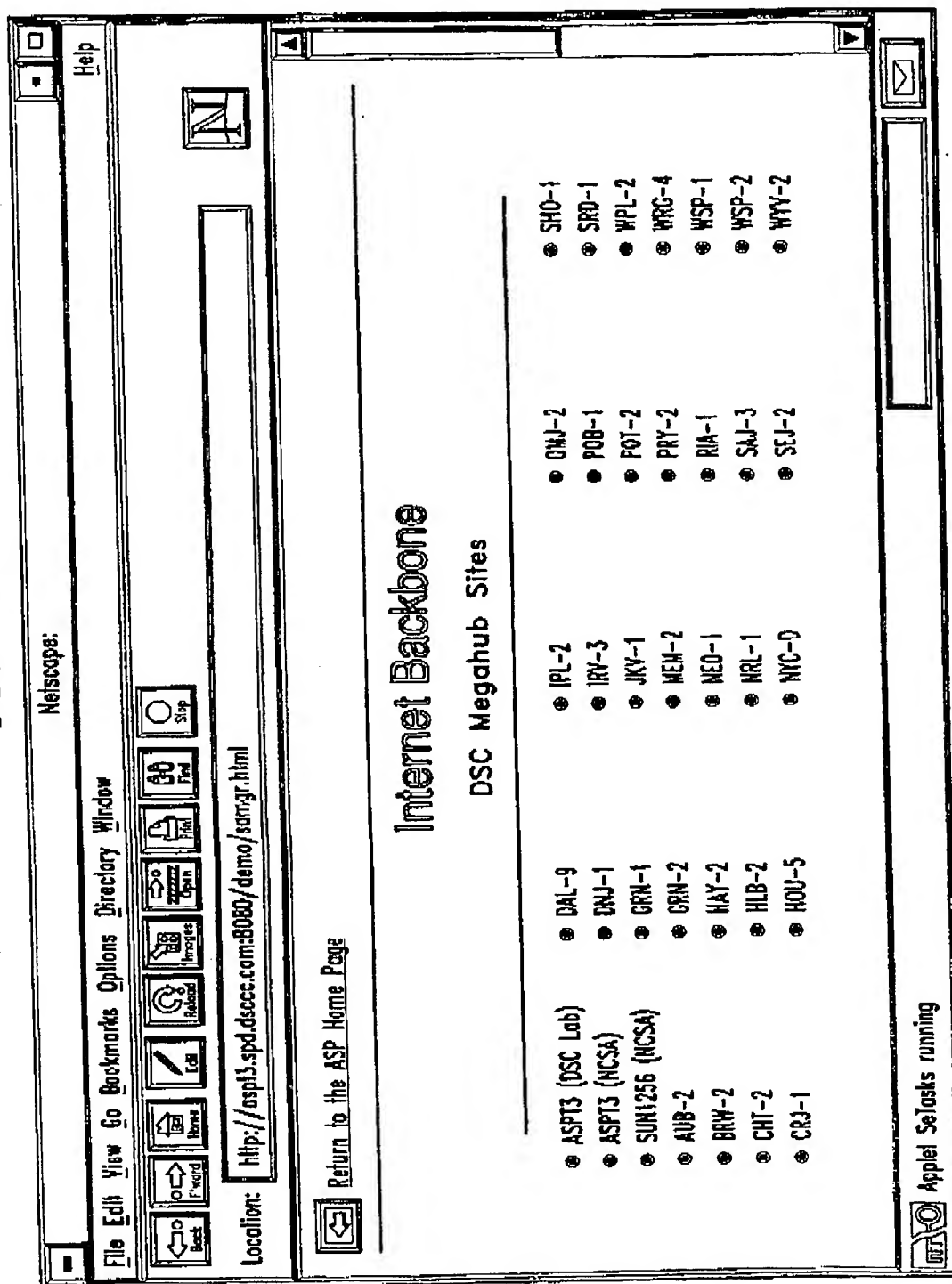


WO 98/33302

PCT/US98/01496

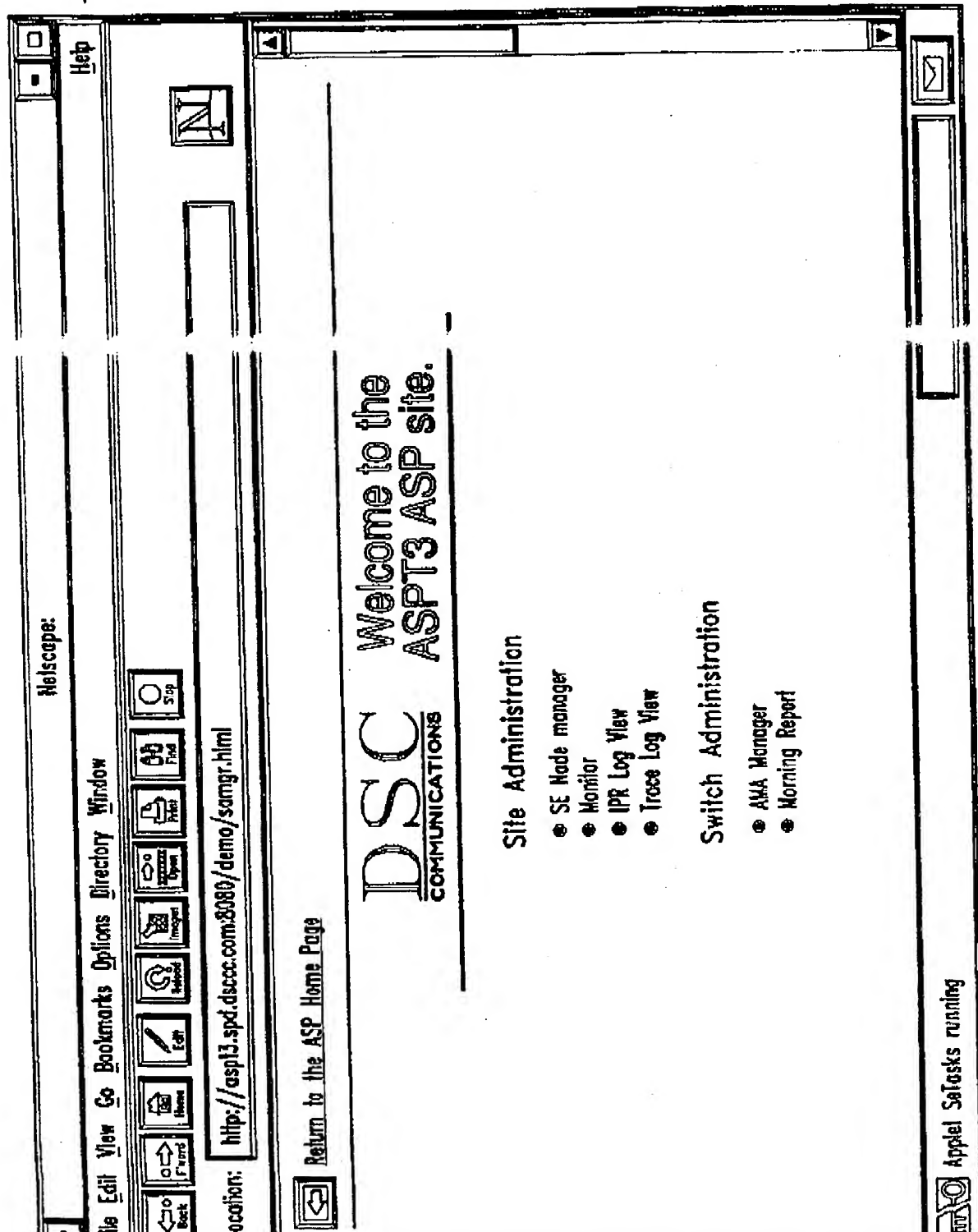
4/9

FIG. 5



5/9

FIG. 6



PCT/US98/01496

6/9

[Return to the ASP Home Page](#)

SE Node Manager

[*Trace Log](#) | [IPR Log*](#)

Registered Tasks

Task Name	Task	Group	Instance	State	Messages	Process	CPU Time
NODE_MANAGER	1	1	0	1	0	12909	0
SELOG_SERVER_MANAGER	130	1	0	1	-1	12931	0
TEST_2_APPLICATION	101	100	0	1	0	12939	0

Link Status

Select Node ID:

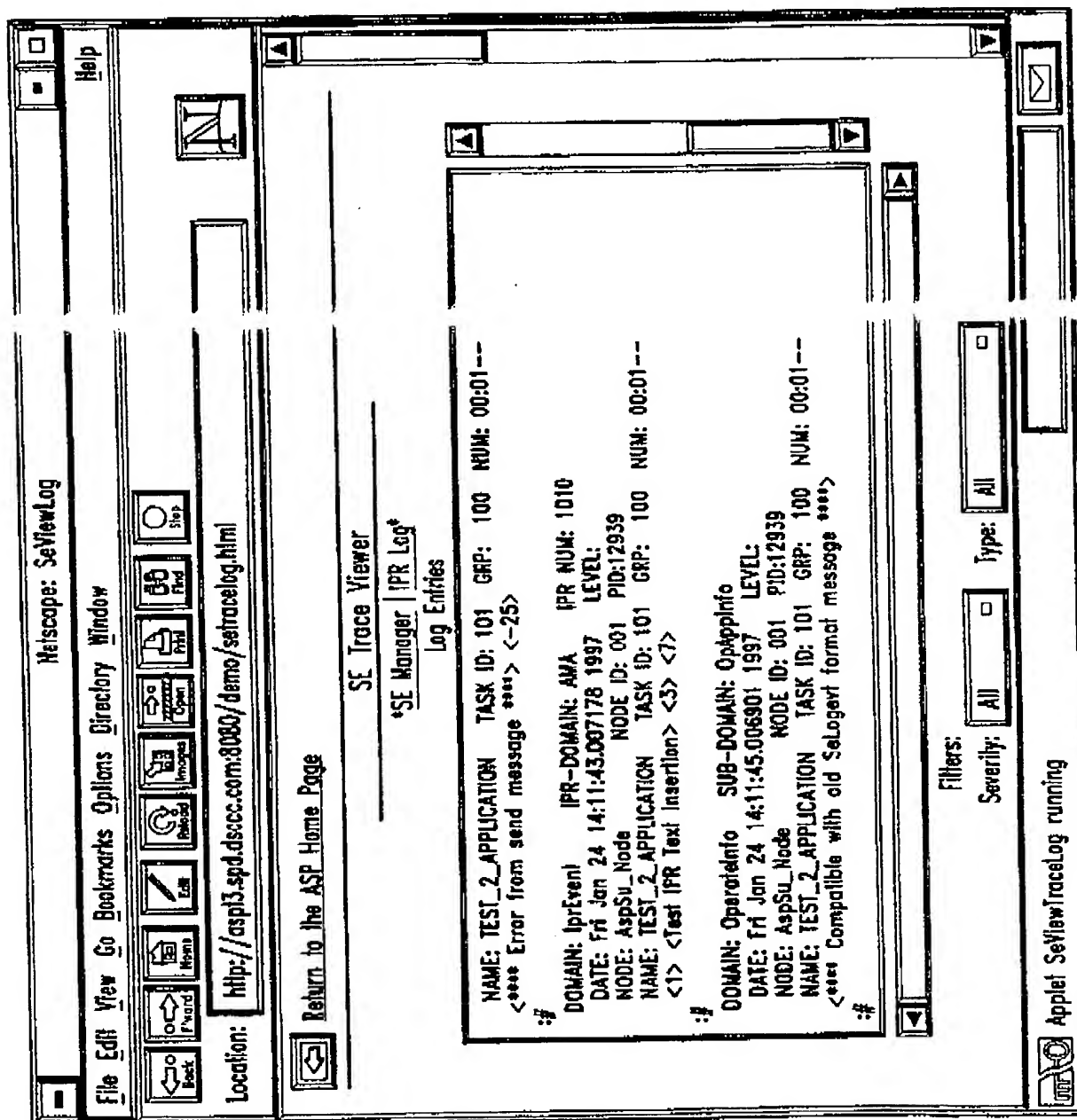
Select Network Controller:

Accent

Apple! SetTasks running

7/9

FIG. 8

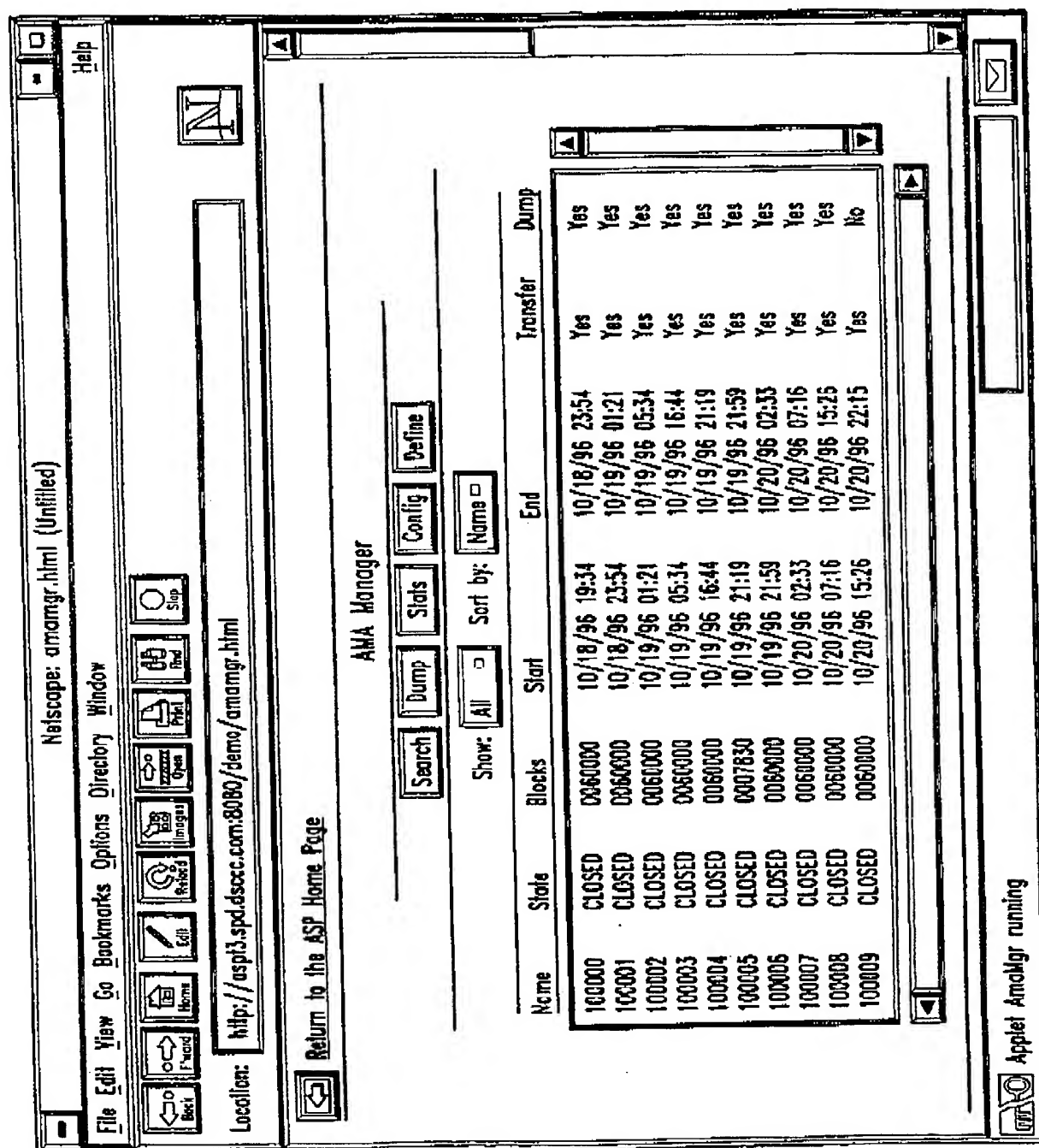


WO 98/33302

PCT/US98/01496

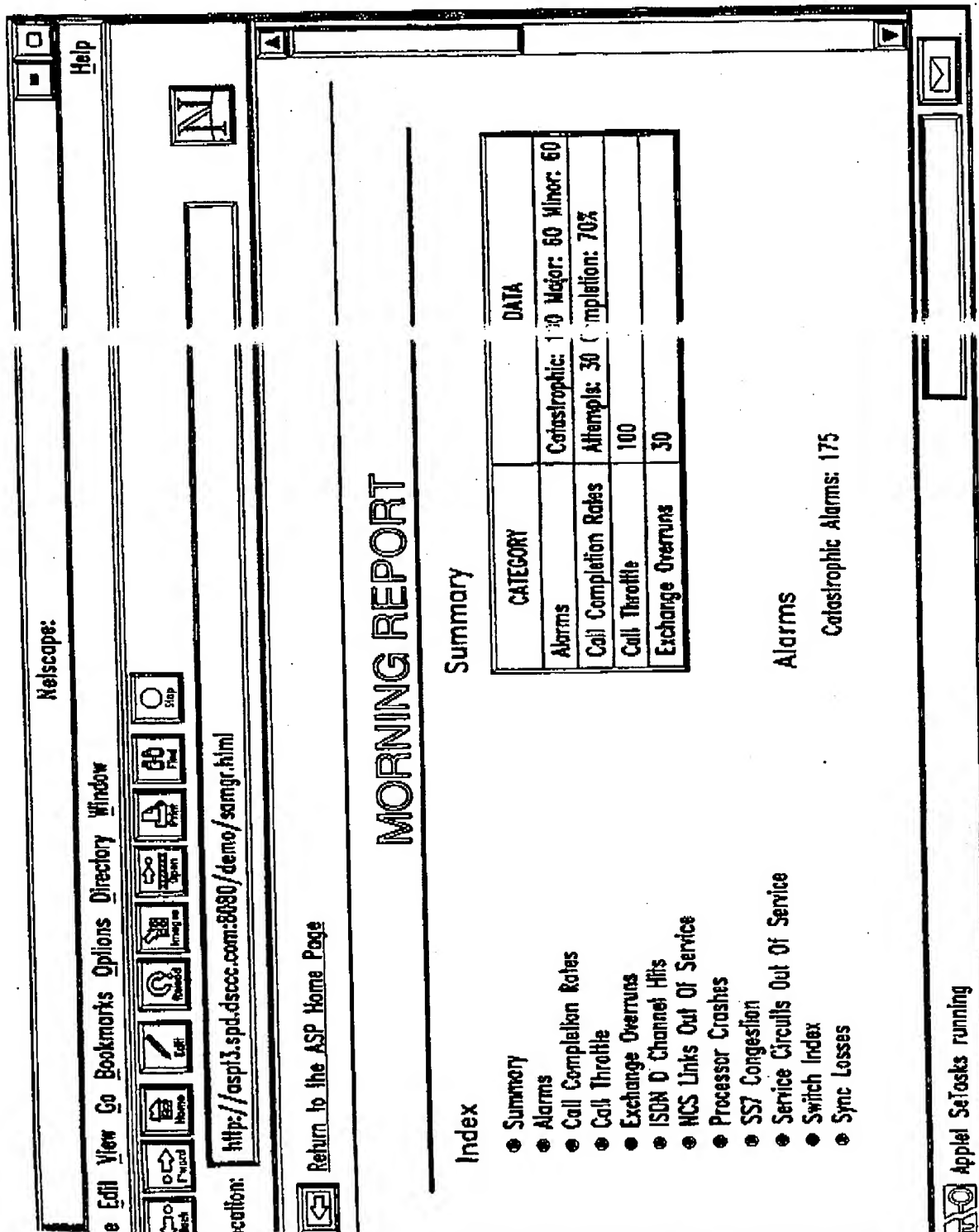
8/9

FIG. 9



9/9

FIG. 10



INTERNATIONAL SEARCH REPORT

National Application No.
PCT/US 98/01496A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04L12/24 H04L12/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04L H040

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	LARSEN A K: "THE NEXT WEB WAVE: NETWORK MANAGEMENT" DATA COMMUNICATIONS, vol. 25, no. 1, 1 January 1996, page 31/32, 34 XP000545237 see the whole document	1,3-7, 9-11, 13-16, 18-20, 22-24, 26,27
Y		2,8,12, 17,21,25
X	BRUNO L: "LASTING LEGACY: BROWSING BIG IRON ON THE WEB" DATA COMMUNICATIONS, vol. 25, no. 15, November 1996, pages 110-112, 116 - 118, 120, XP000639963 see the whole document -/-	1,11,20

☒ Further documents are listed in the continuation of box C.☐ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"A" document member of the same patent family

Date of the actual completion of the international search

3 June 1998

Date of mailing of the international search report

10/06/1998

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Poggio, F

PCT/US 98/01496

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	PENNINO E: "A VISION FOR AN AUTOMATIC MESSAGE ACCOUNTING (AMA) DATA NETWORKING SYSTEM" PROCEEDINGS OF THE NETWORK OPERATIONS AND MANAGEMENT SYMPOSIUM (NOMS), vol. 1, 6 - 9 April 1992, MEMPHIS (US), pages 196-207, XP000344754 see the whole document	2,8,12, 17,21,25
A	LARSEN A K: "WEAVING THE MANGEMENT WEB" DATA COMMUNICATIONS, vol. 25, no. 1, 1 January 1996, page 92, 94 XP000545253 see the whole document	1,11,20
A	HAETOENEN K ET AL: "TASA: TELECOMMUNICATION ALARM SEQUENCE ANALYZER" 1996 IEEE NETWORK OPERATIONS AND MANAGEMENT SYMPOSIUM (NOMS), Kyoto, 15-19, 1996, vol. VOL. 2, no. SYMP. 5, 15 April 1996, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, pages 520-529, XP000634816 see page 527 - page 528	1,11,20
A	HAMILTON M A: "JAVA AND THE SHIFT TO NET-CENTRIC COMPUTING" COMPUTER, vol. 29, no. 8, August 1996, pages 31-39, XP000632765 see page 35	5,15,24